

REMARKS

Claims 1 to 32 are pending. Claims 20 and 21 are allowed and claims 9 to 13 and 30 to 32 are objected to.

1. Claims 1 to 32 are rejected under 35 USC 112, second paragraph. The indefinite language noted in claims 1, 8, 14, 22, and 28 by the Examiner has been amended.

Reconsideration of this rejection is requested.

2. Claims 1 to 8, 15 to 19, 22, 28, and 29 are rejected under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Ebel et al. (U.S. Patent No. 5,667,916). Ebel et al. teach a lithium electrochemical cell having a mixed cathode formulation for achieving end-of-life (EOL) indication. As described at column 1, lines 54 to 64, copper sulfide is mixed with fluorinated carbon to provide a characteristic stepped discharge curve that is a useful end-of-service indicator. Additionally, Ebel et al. state that an alkali metal cell having a CF_x/CuS cathode active admixture has higher rate capability than either of the active constituents. Other materials suitable as the second cathode active material mixed with fluorinated carbon as listed at column 2, line 61 to column 3 line 11. Thus, it is clear that Ebel et al. teach mixing first and second cathode active materials to provide an active admixture use as an EOL indicator.

Independent claim 1 has been amended to set forth that the first fluorinated carbon and the second cathode active material are positioned proximate the respective

opposite major sides of a cathode current collector. This does not necessarily preclude the two active constituents from being mixed with other active materials. However, such a cell construction is neither taught by Ebel et al., nor would have been obvious in light of its teachings. Nowhere does this prior art patent discuss taking two cathode active materials and positioning them on opposite sides of a current collector to provide a cathode electrode construction.

Accordingly, it is believed that amended independent claim 1 is now patentable over Ebel et al. and claims 2 to 8 and 15 to 19 are allowable as hinging from a patentable base claim.

Independent claim 22 has been amended to clean up the previously discussed section 112, second paragraph rejection. However, this claim continues to set forth that the cathode comprises first and second current collectors with CF_x sandwiched there between and with a second cathode active material contacting the opposite sides of the current collectors. The EOL mixtures taught by the Ebel et al. patent would not have lead one skilled in the art to such a cathode construction.

Accordingly, amended independent claim 22 is believed to be patentable over Ebel et al., and claims 28 and 29 are allowable as hinging from a patentable base claim.

Reconsideration of this rejection is requested.

3. Claims 1, 8, 15 to 19, and 22 are rejected under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Weiss et al. (U.S. patent No. 5,180,642) or Sunderland et al.

(U.S. Patent No. 5,811,206). Weiss et al. teach a non-aqueous electrochemical cell having a cathode comprising manganese dioxide (MnO_2), carbon monofluoride (CF_x) or mixtures of the two (column 1, lines 43 to 44 and lines 63 to 65, and column 2, lines 14 to 16). The Sunderland et al. patent relates to an electrochemical cell for powering an implantable medical device. As discussed at column 6, lines 35 to 39, the cathode may comprise a mixture of copper silver vanadium oxide (CSVO) and carbon monofluoride.

In that respect, both Weiss et al. and Sunderland et al. teach mixtures of two cathode active materials for use as a cathode admixture in an electrochemical cell. In that light, these patent references are similar to the previously cited Ebel et al. patent. Thus, similar reasoning as set forth above with respect to the patentability of amended independent claims 1 and 22 over Ebel et al. applies to the present rejection as well.

Accordingly, amended independent claims 1 and 22 are believed to be patentable over both Weiss et al. and Sunderland et al. Claims 8 and 15 to 19 are allowable as hinging from a patentable base claim.

Reconsideration of this rejection is requested.

4. The Applicant would like to particularly draw the Examiner's attention to U.S. Patent No. 5,744,258 to Bai et al. This patent is entered into the record of the application in the accompanying Supplemental Information Disclosure Statement. The Bai et al. patent describes a hybrid electrode of a high-energy electrode material and a high-rate electrode material, both deposited on a current collector. The two materials can be co-deposited

on the current collector in a variety of ways, either in superimposed layers, adjacent layers, intermixed with each other or one material coating the other to form a mixture that is then deposited on the current collector.

In this patent, electrode materials that generally exhibit the characteristics of a battery are referred to as "high-energy" materials and include La, Li, Na, Al, Fe, Zn, Cd, Pb, Sn, Bi, C, V, Mn, Co, Ni, Ag and their oxides, hydroxides, hydrides, carbides, nitride or sulfites, and polyaniline, polythiophene, polyfluorophenylthiopene, polypyrrolle, n-or p-doped polymers, redox polymers. Electrode materials that generally exhibit the characteristics of capacitors are referred to as "high-rate" materials and include carbon (Li-intercalating), WO_3 , TiS_2 , SnOx , $\text{Li}_x\text{Ni}_y\text{O}_z$, LiCoO_2 , LiMn_2O_2 , $\text{LiV}_6\text{O}_{13}$, high-surface area carbon (variously known as activated carbon, carbon black, amorphous carbon. etc.), ruthenium oxide, silver oxide, cobalt oxide, conducting polymers (such as polyaniline, polythiophene, polyfluorophenylthiopene, n- or p-doped polymers, redox polymers, polypyrrolle, Nb, Hf, Ti, Ta, Li, Fe, Zn, Sn, Ru, Ag, Pt, Ir, Pb, Mo, W, Ni, Co and their oxides, hydroxides, hydrides, carbides, nitride or sulfites, and mixtures thereof.

However, of all the high-energy and high-rate materials taught by Bai et al., CF_x is not among them. A preferred form of this active material called out in amended independent claim 1 is "synthesized from a fibrous carbonaceous material having sufficient spacing between graphite layers to substantially restrict expansion due to solvent co-intercalation." The benefits of such an active material are set forth in the

specification at page 6, line 1 to page 8, line 34. There it is described that fluorinated carbon synthesized from fibrous carbonaceous material has sufficient spacing to resist swelling from solvent co-intercalation. Not all fluorinated carbon materials function in this manner, especially those synthesized from petroleum coke.

Thus, amended independent claim 1 is believed to be patentable over the Bai et al. patent as well as the other cited prior art, including the prior art made of record and not relied upon, i.e., the Endo abstract (EP 58-223264).

5. A clean copy of the amended specification paragraphs and the pending claims is attached to the end of this amendment.

It is believed that claims 1 to 32 are now in condition for allowance. Notice of Allowance is requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Michael F. Scalise". The signature is fluid and cursive, with the first name "Michael" being the most prominent part.

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June 9, 2003